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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,348	10/20/2003	Stephan Grunow	TI-36564	4206
23494 7590 08/21/2008 TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265				
EXAMINER				
MOVVA, AMAR				
ART UNIT		PAPER NUMBER		
2894				
NOTIFICATION DATE		DELIVERY MODE		
08/21/2008		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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### Office Action Summary

**Application No.**

10/689,348

**Applicant(s)**

GRUNOW ET AL.

**Examiner**

AMAR MOVVA

**Art Unit**

2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 May 2008.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3 and 5-16 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-3 and 5-16 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date \_\_\_\_\_  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-3 and 5-16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

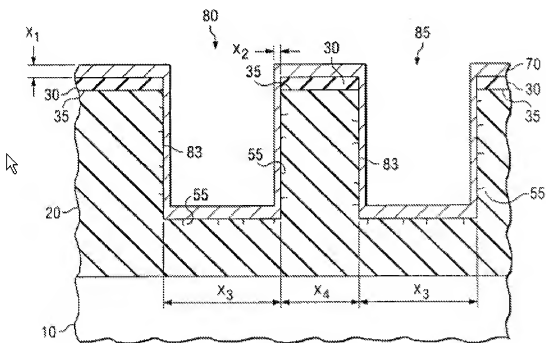
Examiner notes that applicant's independent claims state that the first contiguous barrier layer (70) is formed to thickness X1 over said upper surface (35) of the low K dielectric layer (20) within the trench and X2 on the sidewalls of the trench, wherein the ratio of X1 to X2 is 3:2. The applicable standard for determination of an instance of new matter is that the new claim matter is neither expressly nor inherently disclosed.

Regarding the lack of express disclosure, Applicant's specification discloses a 3:2 ratio vis a vis X1:X2, wherein X1 refers to the barrier layer (70) on the upper surfaces (35) of the low K dielectric outside of the trench (see e.g. fig. 2a reproduced below) and X2 is thickness on the sidewalls of the trench, thus applicant's disclosure only supplies support that the barrier layer is formed to a thickness X1 (ratio 3:2) outside of the trench. While it is possible to, in view of fig. 2a, to find support in applicant's disclosure that a portion of the contiguous barrier layer (70) is thicker in the trench than

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on the sidewalls of the trench it is not sufficient to support a claim that the ratio of  $X_1$  to  $X_2$  is 3:2 with  $X_1$  in the trench.

Furthermore the disclosure does not inherently show a 3:2 ratio since issues that would cause the thicker portion of 70 in the trench vis a vis thicker portion outside of the trench to vary (in PVD and CVD as specified in the specification as the methodology of depositing layer 70) would be poor step coverage depending on the specific materials of the deposition, a lack of knowledge as to what angles were used in the deposition, and whether or not the deposition may have had multiple steps with masks to isolate certain areas for deposition.

*FIG. 2a*

***Response to Arguments***

3. Applicant's arguments filed 5-13-08 have been fully considered but they are not persuasive.

a. Applicant argues that one of ordinary skill in the art would have easily appreciated that the upper surface of the dielectric layer refers to not only the surface (35, fig. 2a) outside of the trench but also the bottom of the trench. It should be noted that applicant's specification expressly discloses: " XI represents the thickness of the non- conformal layer 70 formed over the **upper surface 35** of the low K dielectric layer 20" (lines 13-15, page 8) which identifies the upper surface as element 35. Surface 35 is identified three times for all the surfaces outside of the trench in fig. 2a. **Most critically neither of the bottoms of either trench labels the surface to be element 35.** Thus in light of applicant's specification one of ordinary skill in the art would conclude that the "upper surface" refers to the surfaces 35 labeled outside of the trench. Moreover the labeling of the upper surface in applicant's specification appears to contravene applicant's current interpretation of what the upper surface comprises.

b. Applicant argues that labeling a thickness of one part of the barrier layer on the upper surface does not preclude other portions of the figure from including that same surface. As a preliminary matter examiner notes that the standard is what one of ordinary skill in the art would understand the reference of an upper surface to be not what may be possible. Specifically Surface 35 is identified

three times for all the surfaces outside of the trench in fig. 2a. **Most critically neither of the bottoms of either trench labels the surface to be element 35.** Thus in light of applicant's specification one of ordinary skill in the art would conclude that the "upper surface" refers to the surfaces 35 labeled outside of the trench.

Furthermore 35 USC 112 states that: "the specification shall contain a written description of the invention ... in such full, clear, concise, and exact terms". Even assuming *arguendo* that applicant's argument is correct, the current claims fail to meet the test for 35 USC 112. Thus even taking applicant's argument to be correct, the context of what comprises an upper surface is at best an ambiguity. More aptly put applicant is arguing that absence of evidence is evidence of presence.

c. Applicant argues that it would have been redundant to re-label the bottom portion of the trench barrier layer since it is the same as the layer 70 over the barrier 30. Applicant's argument illustrates the lack of an express disclosure of the thickness of the bottom portion of the trench barrier layer. One of ordinary skill in the art would indeed assume that a thickness illustrated in one section of layer is consistent throughout **had the layer been uniform**. However, barrier layer 70 varies in thickness. One of ordinary skill in the art would not read different portions of layer to be both of X1 thickness when an intervening portion of the layer is of a different thickness and thus express labeling of the bottom portion of the trench barrier layer is necessary. Furthermore had said labeling

been redundant, it would beg the question as to why said upper surface labeling (35, fig. 2a) was repeated three times over the surface outside the trench with no corresponding labeling within the trench.

d. Applicant argues that the deposition techniques disclosed in applicant's disclosure of the contiguous barrier layer 70 (PVD, CVD) would inherently result in equivalent thicknesses on the upper surface outside the trench and the bottom surface. However applicant's stated deposition techniques do not inherently show equivalence of thickness since issues that would cause the thicker portion of 70 in the trench vis a vis thicker portion outside of the trench to vary (in PVD and CVD as specified in the specification as the methodology of depositing layer 70) would be poor step coverage depending on the specific materials of the deposition, a lack of knowledge as to what angles were used in the deposition, and whether or not the deposition may have had multiple steps with masks to isolate certain areas for deposition.

e. **As a side note examiner notes that applicant's arguments that the deposition techniques disclosed in applicant's disclosure inherently result in an equivalent thickness on the upper surface outside of the trench and the bottom surface of the trench then applicant would essentially admit to the fact that the rejection of Cohen in view of Satta (which uses a CVD deposition for the barrier layer) dated 9-8-06 would read on the instant claims.**

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AMAR MOVVA whose telephone number is (571)272-9009. The examiner can normally be reached on 7:30 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on 571-272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Amar Movva  
Examiner  
Art Unit 2891

Am

/Bradley K Smith/  
Primary Examiner, Art Unit 2894